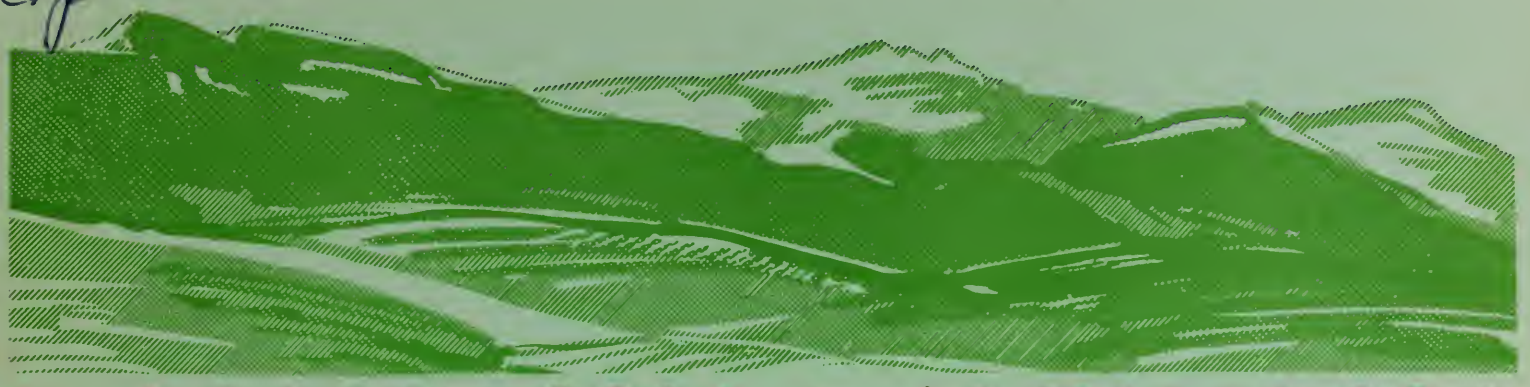

RANGE IMPROVEMENT NOTES

VOL. 3, NO. 1 JAN. 1958

INDEX

(AGRI.-OGDEN)

PUBLISHED BY INTERMOUNTAIN REGION, FOREST SERVICE, U.S. DEPT. AGRICULTURE, OGDEN, UTAH

STATEMENT OF PURPOSE

- - - - -

This publication is printed primarily to inform professional range administrators of important range improvement and management developments and findings. These "Notes" may include extracts of published papers, unpublished preliminary reports of research work, unpublished reports on administrative studies, and personal observations or suggestions of other range administrators. No claim is made as to the accuracy or completeness of studies or conclusions drawn.

All who read these RANGE IMPROVEMENT NOTES are encouraged to submit material for publication, or suggestions for improving its usefulness. Full credit will be given for any material used.

oOo

CONDITION OF LIVESTOCK IN RELATION TO RANGE CONDITION

(We recently asked Dr. Lincoln Ellison of the Intermountain Forest and Range Experiment Station his views on the old question of fat livestock versus range condition. He prepared the following statement which we feel covers this question very well.)

- - - -

The argument that livestock condition is a reflection of range condition is partly true, but the argument that it is an accurate reflection is completely false. This is to say that range condition has something to do with the animal's condition, but not everything; and even more to the point, that there are other considerations in range condition upon which gains in animal weight bear but little.

Studies on the Plains, and indeed on our own Desert Experimental Range in western Utah, have shown that animals do better on range in good condition than on range in poor condition. To argue that the animals are therefore a barometer to the condition of the range is to fall into a logical trap. There is a correlation, and that is all: under some circumstances on level ground, the correlation may be strong; in the mountains it is usually weak.

Consider a range in which the palatable plants have been killed out and the vegetation is made up primarily of unpalatable plants. Are the animals going to go on a hunger strike and quit eating? They certainly are not. They will fill up with whatever plants may be there and, as range livestock demonstrate every year in the Intermountain West, they will get fat on them. What this proves is that plants which are not very palatable may be nutritious. You and I may like potatoes better than carrots and turnips, but as many people before us have demonstrated, if we had nothing else to eat

we could get fat on carrots and turnips. When the palatable herbs are gone the animals will eat unpalatable ones and annual weeds; they will eat shrubs or twigs from the lower branches of trees, and will even eat bark and fallen leaves. No animal likes an empty belly.

Most mountain rangeland that has been overgrazed has lost part of its plant and mulch cover; and whenever severe storms occur, the soil erodes. Spaces between plants are bare and the erosion is often reflected in the fact that the grasses are on remnants of soil as much as an inch or two above the general level. There is very likely to be a drainage pattern of gullies and rills. These features make no difference to the cow: she will graze a grass plant growing on an otherwise bare surface just as eagerly as she would if it were mixed in with other plants as part of a normal cover.

As long as she can fill up with some kind of forage, the range will sustain the cow. But what about long-term values to the cow's descendants? If the soil continues to erode, its productivity will certainly go down, and the distance each succeeding cow has to walk between bites will get greater and greater. Eventually deteriorated range condition will be clearly reflected in poor cow condition -- but only when the deterioration is extreme and the animal can't get enough to eat.

But the cow's condition -- her value at the stockyards -- doesn't tell half of what has happened to the range. It doesn't tell us that, because of overgrazing, an irreplaceable soil has been lost -- a soil that will never be restored during our lifetime or maybe even during the next five hundred years. It doesn't tell us what has happened to the watershed resource -- her condi-

tion doesn't reflect flood damages to reservoirs or to homes or property in the valleys. Her condition -- so many pounds of beef of such-and-such a grade -- doesn't give an evaluation of deterioration in the habitat of game animals, nor does it reflect the fact that, for want of plant cover on the slopes trout streams have been choked with mud and boulders.

In short, livestock condition can be equated to range condition only under rather special circumstances. No matter what the circumstances, one necessary promise in the equation is that the cow not destroy the capital investment represented by the soil and the vegetation of the range. In a balanced enterprise her sustenance must be derived from the interest on that investment -- from a portion of the annual growth of the vegetation -- and no more. The usable interest from the range is only a fraction of the herbage produced: part of it must be retained by the plants to insure further growth, part of it must be left to fall to the ground and protect the soil.

Many an enterprise has seemed prosperous while, all unknown to the general public, it was being mismanaged and consuming its capital assets, eventually to collapse when these were gone.

oOo

Making up your mind is like making up a bed - it helps to have someone on the other side.

- - - -

Good luck and bad luck are usually just other words for good judgment and bad judgment.

- - - -

USE OF INTRODUCED WHEATGRASS SPECIES FOR SPRING GRAZING

(By C. Wayne Cook
Associate Professor of Range Management, Utah State University)

- - - - -

Ewes and lambs were grazed on introduced wheatgrass pastures at Tintic Valley from May 12 until June 16, 1956. The lambs were born in the pastures, therefore, ewe and lamb weights are presented only from May 19 until June 16.

Cows and calves were grazed on introduced wheatgrass pastures at Benmore from May 28 until June 30, 1956. The calves were born before the animals entered the pastures, therefore, weights on both cows and calves are presented from May 28 to June 30.

Intermediate wheatgrass gave the best gains for both sheep and cattle. There was very little difference among the other three wheatgrass species (table 1).

Ewes lost weight slightly during the first grazing period (May 19 to June 6) on both tall and crested wheatgrass but gained 0.47 pounds per day on intermediate wheatgrass. During the second period (June 6 to June 16) ewes lost from 0.25 pounds to 0.18 pounds daily for tall and crested wheatgrass respectively, whereas, on intermediate wheatgrass, they gained 0.31 pounds daily. Therefore, tall and crested wheatgrass was not considered adequate in nutritive content for lactating ewes during the period June 6 to June 16.

Cattle apparently utilize wheatgrasses better than sheep since at no time

from May 28 to June 30 did lactating cows actually lose weight on any of the introduced wheatgrass species.

Intermediate wheatgrass produced markedly better gains for both calves and cows than did the other three introduced wheatgrasses. During the spring grazing period, calves gained 2.3 pounds daily and the cows gained 1.6 pounds daily on intermediate wheatgrass pastures compared to an average of about 1.8 pounds daily for calves and about 0.8 pounds daily gain for cows on the other wheatgrasses (table 1).

Gains for cows and for calves were about the same for early spring grazing compared to late spring grazing for animals on intermediate wheatgrass. However, decreased gains were observed for both cows and calves during the second grazing period (June 17 to June 30) compared to the early grazing period (May 28 to June 16) for the other wheatgrass species (table 1).

Reduction in basal area of plants at Benmore of last summer's drought (1956) was 21.7 percent on tall wheatgrass pastures, 20.7 percent on stiffhair wheatgrass pastures, 16.6 percent on crested wheatgrass pastures, and 15.1 percent on intermediate wheatgrass pastures. Pastures containing a mixture of all four species showed a 16.2 percent basal area reduction for tall wheatgrass, 17.8 percent for stiffhair, 20.8 percent for crested, and 30.7 percent for intermediate wheatgrass. There has been a gradual reduction in intermediate wheatgrass plants since animals were allowed to graze the pastures supporting mixtures. This has been the result of closer utilization of this species.

At Eureka the 1956 summer drought was more severe and caused a reduction in basal area of plants of 43.1 percent on tall wheatgrass pastures, 48.9 percent on crested wheatgrass pastures, and 32.1 percent on intermediate wheatgrass pastures.

Table 1. Average daily gain of livestock on introduced wheatgrass pastures during spring grazing.

	SHEEP					
	Lambs			Ewes		
	5/19-6/5	6/6-6/16	Avg.	5/19-6/5	6/6-6/16	Avg.
Intermediate wheatgrass	0.68	0.54	0.62	0.47	0.31	0.39
Tall wheatgrass	0.54	0.38	0.52	-0.09	-0.25	-0.15
Stiffhair wheatgrass	----	----	----	----	----	----
Crested wheatgrass	0.54	0.40	0.49	-0.10	-0.18	-0.14

	CATTLE					
	Calves			Cows		
	5/28-6/16	6/17-6/30	Avg.	5/28-6/16	6/17-6/30	Avg.
Intermediate wheatgrass	2.3	2.3	2.3	1.5	1.7	1.6
Tall wheatgrass	2.6	0.9	1.8	0.9	0.2	0.6
Stiffhair wheatgrass	2.4	0.9	1.8	2.4	0.6	1.0
Crested wheatgrass	2.5	1.1	1.6	1.2	0.6	0.8

DRIVE SAFELY

We will be doing the most hazardous driving of the year during the next few months. We will be driving early and late to and from conferences, rangers' meetings, association meetings, etc. Due to the nature of the trips we will unavoidably have many weighty problems on our mind. Driving will often be complicated by bad weather conditions. Because of these factors extreme driving caution should be exercised.

Remember that wet ice is slicker than dry ice! Slippery surfaces in the process of thawing or freezing can trick you unless you're watching carefully.

Cuss the weather all you want, but put the blame for accidents where it belongs - inside the vehicle and behind the steering wheel.

oOo

Bits of Philosophy

Take a lesson from the latest model cars - whether it's "This-O-matic" or "That-O-Matic" drive, you must shift yourself when you need to get out of reverse and go forward.

- - -

Time wounds all heels!

- - -

FORAGE PRODUCTION OF SUMMER RANGES FOLLOWING APPLICATION OF 2, 4-D TO KILL BIG SAGEBRUSH (Artemisia tridentata)

By David Raymond Mead

- - - - - - - -

SUMMARY

A study dealing with the chemical spraying of big sagebrush (Artemisia tridentata var. typica) was conducted by the U. S. Forest Service on a summer sheep allotment in eastern Idaho.

The objectives of the study were to determine: (1) effects of 2, 4-D spraying and various management practices upon forage production, (2) the permanence of the effects of spraying with 2, 4-D on the plant composition and productivity, and (3) the effects of spraying and management upon availability of forage plants to livestock. Grazing management practices investigated after spraying were: (1) complete protection, (2) deferment for one, two, and three years, and (3) non-deferment.

The experiment was established on an area of dense sagebrush with a grass and forb understory. The study area was divided into sections, each one receiving a different deferment treatment. Herbage weight estimates and the percent of forage available to livestock were recorded on 120 subplots, 48 square foot in area. Parker 3-step transects were also established. In late June of 1953, a major part of the study area was sprayed by airplane with two pounds acid equivalent of 2, 4-D per acre mixed with oil. The remaining study area was used as the control. At the time of spraying,

sagebrush had obtained about one-half of its current year's growth, and Idaho fescue was in the early head stage.

One year after spraying, it was estimated that 97.8 percent of the sagebrush foliage had been killed on the sprayed area.

The grass yields on the sprayed area increased 301.3 percent by 1956, whereas, those on the unsprayed area increased only 13.4 percent. These differences were highly significant. The grasses did not increase immediately, but took several years to increase in vigor and spread out.

The ungrazed plot (analyzed as being deferred three years) was greater in its production of grass than the non-deferred or the one- and two-year deferment plots. These results suggest that there is no advantage in deferring a sprayed area for one or two years; but by deferring for a three-year period, significantly greater yields are obtained.

2,4-D decreased forb production one year after spraying. By 1956 however, there were no significant differences between the sprayed and unsprayed areas. Forb yields were not affected by deferment.

One year after spraying, the total herbage production (sagebrush, grass, and forbs) on the unsprayed area was almost twice as much as on the sprayed area. At the end of three years, the total yields on the sprayed area was 20.5 percent more than on the unsprayed area. This was attributed to the increased grass on the sprayed area even though the sagebrush was eliminated.

Indian paintbrush, lupine, and death camas were heavily affected by 2,4-D over the three-year period; and mountain dandelion and one-flower helianthella were moderately affected. The long time effect on pussytoes,

bluebell, cinquefoil, and groundsel was light.

Daisy fleabane, dandelion, dock eriogonum, geranium, locoweed, phlox, old man's whiskers, sandwort, shooting star, violet, and western yarrow were not noticeably affected by 2, 4-D over the three-year period. However, some of these plants did show some immediate responses to 2, 4-D.

Sagebrush seedlings have been invading the sprayed area since it was sprayed. This area averaged five times as many juvenile sagebrush plants as did the unsprayed area.

One year of deferment on the sprayed area seemed to have been the least desirable. The grass did not increase, forb production decreased, and more juvenile sagebrush plants were found on this plot. To some extent the unsprayed area also behaved similarly in that forb production was lowest and more juvenile sagebrush plants were founds.

Forage density was greater on the sprayed area. The amount of bare soil on the entire study area decreased with deferment.

Three years after spraying, 75 percent of the grass on the sprayed area was available to livestock, and, on the unsprayed, 60.5 percent. These differences were significant. There was no relationship between length of deferment and percent of available grass. This suggests that sheep do not knock down much sagebrush, but that the dead brush dislodged and rotted away naturally.

The quantity of available grass (grass yields x percent of grass available) on the sprayed area was 4.3 times greater than on the unsprayed area.

This was the result of an increase in the production and percent of grass available. The amount of available forbs differed very little between areas. The quantity of available forage increased on the sprayed area as the length of the period of deferment increased. *

Table I

Percent of sagebrush foliage killed by 2, 4-D spray as shown by the average amount of big sagebrush herbage produced on the sprayed and unsprayed areas and the percent decrease since spraying in 1953 (grams air dry weight per 48 square foot plot)[1]

	Weight 1953	Weight 1954	Percent decrease	Weight 1955	Percent decrease	Weight 1956	Percent decrease
Sprayed area	335.2	7.4	97.8	3.7	98.9	.5	99.9
Unsprayed area	395.0	324.7	17.8	203.0	48.6	199.2	49.6

[1] The average gram weights may be converted to pounds per acre by multiplying by 2.

* Summary taken from thesis written by David Raymond Mead, Utah State University, Logan, Utah. 1958

Table II

Average amount of total herbage produced under four different treatments on the sprayed area as compared with the unsprayed area as a whole, and percent change in production since 1953. (grams dry weight per 48 square foot plot)[1]

	Weight 1953	Weight 1954	Weight 1955	Weight 1956	Weight 1956	Percent change[3]
Sprayed area						
Average	497.6	280.3	422.0	492.1		-1.1
Nondeferred	466.3	293.8	456.8	477.7	501.1 (433.0)[4]	2.4
One-year deferment	541.4	215.0	375.3	421.7	408.3 (343.6)	-22.1
Two-year deferment	454.2	330.7	418.8	498.1	527.5 (457.1)	9.7
Three-year deferment	528.3	381.6	437.2	570.8	563.8 (491.8)	8.0
Unsprayed area						
Average	580.0	531.3	409.9	391.6	359.2 (-----)	-32.5

1. The average gram weights may be converted to pounds per acre by multiplying by 2.

2. Adjusted to allow for differences in original weights among treatments.

3. Based on weights of 1953 and 1956.

4. Figures in parenthesis represent Duncan's lower significant limit. Any mean value lower than the lower significant limit value is significantly different at the .05 level.

Table III

Average number of juvenile sagebrush plants per 48 square foot plot determined three years after spraying.

	1-3 years old	Current seedlings	Total
Sprayed area			
Nondeferred	1.9	1.1	3.0
One-year deferment	1.5	2.4	3.9
Two-year deferment	0.5	1.1	1.6
Three-year deferment	2.5	0.7	3.2
Average	1.6	1.3	2.9
Unsprayed area			
Nondeferred	0.0	0.0	0.0
One-year deferment	1.3	0.05	1.35
Two-year deferment	0.0	0.0	0.0
Three-year deferment	1.0	0.0	1.0
Average	0.6	0.01	0.6

Table IV

Comparison of quantity of forage[1] available to livestock in 1956 on sprayed and unsprayed areas (grams per 48 square foot plot)[2]

	SPRAYED			UNSPRAYED		
	Adjusted production (weight)	Adjusted percent available	Quantity of available forage	Adjusted production (weight)	Adjusted percent available	Quantity of available forage
Grass						
Average	427.8	75.5	322.9	121.2	60.0	75.3
Nondeferred	380.8	79.9	304.3	138.7	55.3	76.7
One-year deferment	382.3	70.9	271.0	194.3	71.5	138.9
Two-year deferment	429.3	79.3	340.4	94.0	55.9	52.5
Three-year deferment	518.7	71.8	372.4	57.9	57.4	33.2
Forbs						
Average	61.6	74.2	46.0	66.3	66.1	43.7
Nondeferred	63.3	81.4	51.5	62.3	56.9	35.4
One-year deferment	49.4	66.2	32.7	58.5	77.9	45.6
Two-year deferment	68.9	82.0	56.5	65.5	63.1	41.3
Three-year deferment	64.6	67.1	43.3	78.8	66.6	52.5

1. Big sagebrush is not included.
2. Pounds per acre may be obtained by multiplying gram weight by 2.